

# TECHNICAL GUIDANCE DOCUMENT

## INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

### Engineering References for Environmental Remediation



Office of Land Quality

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#### General References for Environmental Remediation

- [Remediation Technologies Development Forum \(RTDF\)](#), Partnership between USEPA, Other Government Organizations, Private Industry, and Academia
- [Interstate Technology and Regulatory Council \(ITRC\)](#), Funded by the US Dept. of Defense, Dept. of Energy, and the Environmental Protection Agency
- [Federal Remediation Technology Roundtable \(FRTR\)](#), Interagency Committee including U.S. Army Environmental Center U.S. Army Corps of Engineers, Hazardous Toxic and Radioactive Waste Center, U.S. Air Force Center for Environmental Excellence, U.S. Naval Facilities Engineering Service Center, U.S. Environmental Protection Agency, Technology Innovation Office, U.S. Environmental Protection Agency, National Risk Management Research Laboratory, and the U.S. Department of Energy
- [U.S. EPA 510-R-04-002](#), "How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites", 2004
- [U.S. Army Corps of Engineers Reference Manuals](#) - see specific manuals listed below with technologies
- [Battelle Research Site](#) provides engineering information on a variety of environmental topics
- [U.S. EPA Engineering Technical Support Center](#)

#### Books:

- Environmental Engineering Guide and Handbook, American Academy of Environmental Engineers, 1996
- Civil Engineering Reference Manual, American Society of Civil Engineers (ASCE) and National Society of Professional Engineers (NSPE), 1992
- Remediation Engineering: Design Concepts, Suthersan, S.S.; 1996; Lewis Publisher Inc, Boca Raton

#### Specific Remedial Technologies:

- Air Sparging:

- [Air Sparging Guidance Document](#), Naval Facilities Engineering Command, August 2001. (This is a typical example of an ITRC reference)
  - [Engineering and Design: In-Situ Air Sparging \[PDF\]](#) - EM 1110-1-4005 In-Situ Air Sparging, January 2008
- Bioremediation:
  - U.S. EPA Innovative Site Remediation Technology Series - Vol 1: EPA 542-B-97-004 "Bioremediation"
- Chemical Treatment:
  - U.S. EPA Innovative Site Remediation Technology Series - Vol 2: EPA 542-B-97-005 "Chemical Treatment"
- Free Product Removal:
  - [How To Effectively Recover Free Product At Leaking Underground Storage Tank Sites](#): A Guide For State Regulators (EPA 510-R-96-001)
- Natural Attenuation:
  - U.S. EPA, Air Force Center for Environmental Excellence (AFCEE):
    - Technical Protocol for Implementing Intrinsic Remediation
    - Understanding Chlorinated Hydrocarbon Behavior in Groundwater, Wisconsin Department of Natural Resources, Dec, 2002
    - Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action, USEPA Office of Solid Waste and Emergency Response, 2001
- Multi-Phase Extraction:
  - U.S. Army Corps of Engineers, Engineering Manuals - EM 1110-1-4010 Multi-Phase Extraction
- Soil Vapor Extraction:
  - U.S. Army Corps of Engineers, Engineering Manuals - EM 1110-1-4001 Soil Vapor Extraction and Bioventing, June 2002
  - U.S. EPA Innovative Site Remediation Technology Series - Vol 7: EPA 542-B-97-010 "Vacuum Extraction and Air Sparging"
- Thermal Desorption:
  - U.S. EPA Innovative Site Remediation Technology Series - Vol 5: EPA 542-B-97-008 "Thermal Desorption"
- Landfill Design:
  - EPA/625/4-9/022, "Requirements for Hazardous Waste Landfill Design, Construction, and Closure".
  - EPA/600/2-79-165, "Design and Construction of Covers for Solid Waste Landfills".
  - EPA/625/4-91/025, "Design and Construction of RCRA/CERCLA Final Covers".
  - EPA/600/R-93/182, "Quality Assurance and Quality Control for Waste Containment Facilities".

- Cost Estimation and Cost/Benefit Analysis:
  - Rast, Richard, Environmental Remediation Estimating Methods, R.S. Means Company, 2003
  - [Federal Remediation Technologies Roundtable](#): Cost and Performance Case Studies.
  - [Cost Estimating Tools and Resources for Addressing Sites Under the Brownfields Initiative](#), EPA/625/R-99/001, April 1999
- Modeling, Fate and Transport:
  - U.S. EPA Center for Subsurface Modeling Support CSMoS:
    - Bioscreen Natural Attenuation Decision Support System
    - Biochlor Natural Attenuation Screening Model for Chlorinated Solvents, March 2002
    - MODFLOW/MT3D Solute Transport Model
  - U.S. EPA Support Center for Regulatory Air Models (SCRAM):
    - Industrial Source Complex Short Term 3 Model (ISCST3), April 2000
    - SCREEN3 Single Source Screening Model
  - [U.S. EPA Site for Modeling Subsurface Petroleum Hydrocarbon Transport](#)
- Statistical Evaluations:
  - General Evaluation:
    - [Practical Methods for Data Analysis](#), QA/G-9 (QA00 Update), U.S. EPA, (EPA/600/R-96/084), July 2000
  - Upper Confidence Limits (UCL):
    - [Pro-UCL User Guide](#), National Service Center for Environmental Publications, U.S. EPA, April 2004